

LITMANOVICH, K.Yu.; TEODOROVICH, V.I.

Functional and morphological changes in the aorta following
intimectomy. Eksp.khir.i anest. 6 no.3:61-63 '61. (MIRA 14:10)
(AORTA--SURGERY)

AKKERMANN, V.V.; TUKACHINSKIY, S.Ye.; TEODOROVICH, V.I.; CHERNOMORDIK, B.L.;
MOISEYEVA, V.P.; LUGANOVA, I.S.; SHULUTKO, L.S.; KURALEVA, V.V.;
SOKOLOVA, T.S.

Some morphological and functional properties of the blood in
patients with essential polycythemia. Probl.gemat.i perel.
krovi 6 no.4:30-33 Ap '61. (MIRA 14:6)

1. Iz Leningradskogo ordena Trudovogo Krasnogo Znameni nauchno-
issledovatel'skogo instituta perelivaniya krovi (dir. - dotsent
A.D. Belyakov, nauchnyy rukovoditel' - chlen-korrespondent
AMN SSSR prof. A.N. Filatov).
(POLYCYTHEMIA) (BLOOD)

TEODOROVICH, V. I.; SENCHILO, Ye. A.; SERIKOVA, A. Z.

Use of thrombocyte suspensions for therapeutic purposes in
Werlhof's disease. Probl. gemat. i perel. krovi no.8:20-27
'62. (MIRA 15:7)

1. Iz Leningradskogo ordena Trudovogo Krasnogo Znameni instituta
perolivaniya krovi (dir. -- dotsent A. D. Belyakov, nauchnyy
rukovoditel' - chlen-korrespondent AMN SSSR prof. A. N. Filatov)

(PURPURA(PATHOLOGY)) (BLOOD PLATELETS)

TEODOROVICH, V.I.; SHULUTKO, I.S.

Use of plastic bags for the preparation and preservation of blood components. Probl. gemat. i perel. Krovi 3 no.9:32-34 S '63.
(MIRA 17:9)

1. Iz Leningradskogo ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skogo instituta perelivaniya krovi (dir. - dotsent A. D.Belyakov, nauchnyy rukovoditel' - chlen-korrespondent AMN SSSR prof. A.N.Filatov).

CHAPLYGINA, Z.A.; TEODOROVICH, V.F.

Histochemical and functional study of the reticuloendothelial system of experimental animals following infusion of a polyvinyl blood substitute solution. Probl. gemat. i perel. krovi 10 no.2:48-52 F '64. (MIRA 19:1)

1. Leningradskiy nauchno-issledovatel'skiy institut perelivaniya krovi (dir. - dotsent A.D. Belyakov).

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik

Histomorphological changes in the hemopoietic organs following transfusion of infected blood. Akt.vop.perel.krovi no.4:137-139 '55.

(MIRA 13:1)

1. Patologo-anatomicheskaya laboratoriya Leningradskogo instituta perelivaniya krovi.

(HEMOPOIETIC SYSTEM)

(BLOOD--TRANSFUSION)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik; ROMANOVA, A.M., nauchnyy
sotrudnik

Use of fibrin sutures in gastrointestinal anastomoses. Akt.vop.perel.
krovi no.4:169-171 '55. (MIRA 13:1)

1. Khirurgicheskaya klinika (zav. - cheln-korrespondent AMN SSSR,
prof. A.N. Filatov) i patologo-gistologicheskaya laboratoriya Lenin-
gradskogo instituta perelivaniya krovi.
(FIBRIN) (SUTURES)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik

Suture material from the nerves of cattle. Akt.vop.perel.krovi no.4:
171-173 '55. (MIRA 13:1)

1. Patologo-anatomicheskaya laboratoriya Leningradskogo instituta
perelivaniya krovi.

(SUTURES)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik

Experimental treatment of thrombopenia by suspension of thrombocytes
and of their preparations. Akt.vop.perel.krovi no.4:177-179 '55.

(MIRA 13:1)

1. Laboratoriya konservirovaniya krovi Leningradskogo instituta pereli-
vaniya krovi (sav. laboratoriyey - starshiy nauchnyy sotrudnik A.D.
Belyakov).

(BLOOD--DISEASES)

(BLOOD PLATELETS)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik

Influence of guanine and its derivatives on the leukopoietic function
of the bone marrow. Akt.vop.perel.krovi no.4:217-219 '55.

(MIRA 13:1)

1. Patologo-anatomicheskaya laboratoriya Leningradskogo instituta
perelivaniya krovi.

(GUANINE--PHYSIOLOGICAL EFFECT) (LEUCOCYTES) (MARROW)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik

Morphological changes in the organs participating in extramedullary hemopoiesis following use of guanine and its derivatives. Akt.vop. perel.krovi no.4:219-220 '55. (MIRA 13:1)

1. Gematologicheskaya klinika Leningradskogo instituta perelivaniya krovi (zav. klinikoy - prof. S.I. Sherman).

(GUANINE--PHYSIOLOGICAL EFFECT)

(HEMOPOIETIC SYSTEM)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik

Effect of metacil on leukopoiesis. Akt.vop.perel.krovi no.4:220-223
'55. (MIRA 13:1)

1. Gematologicheskaya klinika Leningradskogo instituta perelivaniya
krovi (zav. klinikoy - prof. S.I. Sherman).
(URACIL) (LEUCOCYTES)

TEODOROVICH, V.P.

Morphological changes in the hemopoietic organs in experimental vitamin E deficiency. Akt.vop.perel.krovi no.4:224-226 '55. (MIRA 13:1)

1. Laboratoriya konservirovaniya krovi (zav. laboratoriyey - starshiy nauchnyy sotrudnik A.D. Belyakov).
(HEMOPOIETIC SYSTEM) (DEFICIENCY DISEASES) (TOCOPHEROL)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik

Influence of bone marrow extract on experimental leukopenia. Akt.vop.
perel.krovi no.4:234-236 '55. (MIRA 13:1)

1. Patologo-anatomicheskaya laboratoriya Leningradskogo instituta
perelivaniya krovi.

(LEUCOPENIA)

(TISSUE EXTRACTS)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik

Preservation of muscle tissue. Akt.vop.perel.krovi no.4:274-277 '55,
(MIRA 13:1)

1. Laboratoriya konservirovaniya krovi (zav. laboratoriyey starshiy
nauchnyy sotrudnik A.D. Belyakov) Leningradskogo insituta perelivaniya
krovi.

(MUSCLE)

TEODOROVICH, V.P.; ROMANOVA, A.M.

Use of sutures of fibrin threads in gastric surgery. Khirurgiia
no.7:68-70 J1 '55. (MLRA 8:12)

1. Iz khirurgicheskoy kliniki (zav.-prof. A.N. Filatov) i
patologogistologicheskoy laboratorii (zav. V.P.Teodorovich)
Leningradskogo nauchno-issledovatel'skogo instituta pereli-
vaniya krovi Ministerstva zdravookhraneniya RSFSR (dir.-
dotsent A. Ye. Kiselev)

(STOMACH, surg.

fibrinous sutures)

(SUTURES,

fibrinous in surg, of stomach)

BOGOMOLOVA, L.G., doktor meditsinskikh nauk; TEODOROVICH, V.P.;
TUKACHINSKIY, S.Ye.

Study of the resorption rate of hemostatic sponge in a living organism
by means of radioactive indicators [with summary in English, p.156]
Vest.khir. 77 no.3:44-48 Mr '56. (MLRA 9:7)

1. Iz Leningradskogo instituta perelivaniya krovi (dir. dots.
A.D.Belyakov)

(TAMPONS

hemostatic sponge, resorption study)

(HEMOSTASIS

same)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik; TEODOROVICH, V.I., starshiy
nauchnyy sotrudnik

Treatment of radiological leukopenia with leucocyte preparations.
Akt.vop.perel.krovi no.6:57-63 '58. (MIRA 13:1)

1. Patologo-anatomicheskaya laboratoriya (zav. laboratoriyey - starshiy
nauchnyy sotrudnik V.P. Teodorovich) i laboratoriya konservirovaniya
krovi (zav. laboratoriyey - starshiy nauchnyy sotrudnik M.A. Rozhdest-
venskaya) Leningradskogo instituta perelivaniya krovi.
(LEUCOPENIA) (X RAYS--PHYSIOLOGICAL EFFECT)
(LEUCOCYTES--THERAPEUTIC USE)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik

Influence of the spleen on the course of radiation leucopenia. Akt.
vop.perel.krovi no.6:109-111 '58. (MIRA 13:1)

1. Patologo-anatomicheskaya laboratoriya Leningradskogo instituta
perelivaniya krovi.
(LEUCOPENIA) (SPLEEN--TRANSPLANTATION)
(RADIATION--PHYSIOLOGICAL EFFECT)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik; TEODOROVICH, V.I., strashiy
nauchnyy sotrudnik

Treatment of experimental leucopenias with leucocyte suspensions of
varying composition. Akt.vop.peral.krovi no.6:150-157 '58.

(MIRA 13:1)

1. Patologo-anatomicheskaya laboratoriya (zav. laboratoriyey - starshiy
nauchnyy sotrudnik V.P. Teodorovich) i laboratoriya konservirovaniya
krovi (zav. laboratoriyey - starshiy nauchnyy sotrudnik M.A. Rozhdest-
venskaya) Leningradskogo instituta perelivaniya krovi.

(LEUCOPENIA)

(LEUCOCYTES--THERAPEUTIC USE)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik; KOTOVSHCHIKOVA, M.A., kand.
biol.nauk; BLEKSMIT, Z.D., nauchnyy sotrudnik

Influence of anticoagulants on experimental thromboses. Akt.vop.
perel.krovi no.6:216-218 '58. (MIRA 13:1)

1. Patologo-anatomicheskoye otdeleniye i laboratoriya sukhikh prepa-
ratov Leningradskogo instituta perelivaniya krovi.
(ANTICOAGULANTS (MEDICINE)) (THROMBOSIS)

FILATOV, A.N., prof.; GANKEVICH, G.A., nauchnyy sotrudnik; TEODOROVICH, V.P.,
starshiy nauchnyy sotrudnik

Experimental studies on the reproduction and prevention of gastric
ulcer in dogs. Akt.vop.perel.krovi no.7:228-242 '59. (MIRA 13:1)

1. Chlen-korrespondent AMN SSSR (for Filatov).
(PEPTIC ULCER) (CINCHOPHEN)

TEODOROVICH, V.P., starshiy nauchnyy sotrudnik

Use of embryonic tissues for some plastic surgery. Akt.vop.perel.
krovi no.7:264-266 '59. (MIRA 13:1)

1. Patologo-anatomicheskaya laboratoriya (zav. laboratoriyey - starshiy
nauchnyy sotrudnik V.P. Teodorovich) Leningradskogo instituta pereli-
vaniya krovi.

(SKULL--SURGERY)

(FETAL MEMBRANES--TRANSPLANTATION)

AKKERMAN, V.V.; TEODOROVICH, V.P.

Association of tuberculosis of the spleen with thrombocytopenic
purpura. Probl. gemat. i perel. krovi 6 no.3:30-33 M^r '61.

(MIRA 14:3)

(SPLEEN--TUBERCULOSIS)

(PURPURA (PATHOLOGY))

TEODOROVICH, V.P.; BERLINER, G.B.

Clinical morphological study of Marchiafava-Micheli disease.
Probl. gemat. i perel. krovi 9 no.4:15-18 Ap '64.

(MIRA 17:11)

1. Gematologicheskaya klinika (zav. - prof. S.I. Sherman) i
patologoanatomicheskaya laboratoriya (zav. - dotsent V.P. Teo-
dorovich) Leningradskogo ordena Trudovogo Krasnogo Znameni
nauchno-issledovatel'skogo instituta perelivaniya krovi (dir. -
dotsent A.D. Belyakov, nauchnyy rukovoditel' chlen-korrespondent
AMN SSSR prof. A.N. Filatov).

CHAPLYGINA, Z.A.; ZHILYAYEVA, R.V.; TEODOROVICH, V.P.

Immunogenesis in experimental animals following the introduction
of polyvinol, a blood-substituting solution. Zhur. mikrobiol.,
epid. i imm. 41 no. 2:142-143 F '64. (MIRA 17:9)

1. Leningradskiy institut perelivaniya krovi.

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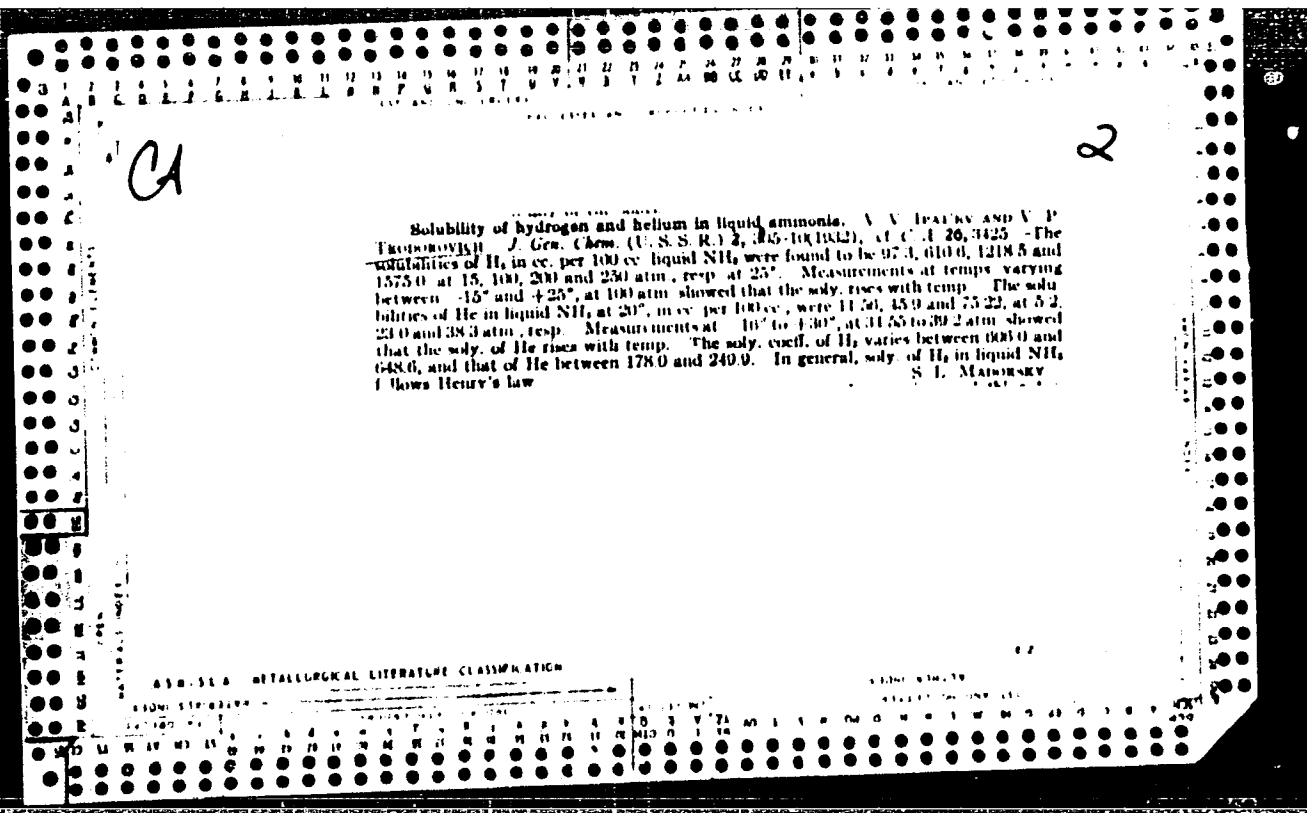
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TEODOROVICH, V.P., kand. khim. nauk; KOIGATIN, M.N., kand. tekhn. nauk;
deriabina, V.I., inzh.

Examining catalytic reforming apparatus. Khim. i nef. mashinost. (MIRA 18:12)
no.8:33-37 Ag '65.

CH

Theory of the substitution of metals by hydrogen under pressure. II. Separation of metals of the fifth group in solutions of their chlorides under pressure. V. V. IPAT'EV, JR. AND V. P. TROPOPOVICH. *J. Gen. Chem. (U. S. S. R.)* 1, 729-35 (1931). *Rev. 45B, 575-9 (1932).*—The following were studied: (1) the relation of As, Sb and Bi to each other during mutual substitution with H under pressure; (2) the possibility of sepg. these metals from each other by means of H under pressure; (3) their places in the soln tension series. The expts. were made in an Ipat'ev app. It was found (1) H under pressure and high temps. can be used to sep. metals from each other from their salt solns. (2) The most noble is As, then Sb and then Bi. (3) In the sepg. of Bi from As, As ppts. and Bi remains in the soln. (4) In the sepg. of Sb from As, As ppts. and Sb remains in the soln. (5) Sb can be sepd. from Bi only partly and only if an excess of Sb is present in the soln.; at a definite exhaustion of Sb in the soln. Bi ppts. from the soln., whereby the proportion of the concns. of the salts of Bi and Sb in the soln. reach a no. between 8 and 10. *Conclusion:* The difference of the potential of each metal in solns. of the same concn. is not greater than 0.02. H. G.



BC 7508000110 H

41

Solubility of hydrogen in water under pressure and at high temperatures. V. IPATIEV, jun., and V. P. TROSONOVITSCH (J. Gen. Chem. Russ., 1934, 4, 395-397). Deviations from Henry's law are observed above 200° at 100 atm. R. T.

ASM-SLA DETALLURGICAL LITERATURE CLASSIFICATION

SEARCHED	INDEXED	SERIALIZED	FILED	RECEIVED	DATE
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100 AND 1000 SERIES										100 AND 1000 SERIES									
PROCESS AND PROPERTIES INDEX																			
<p><i>BC</i></p> <p><i>B-I-3</i></p> <p>Diffusion of hydrogen and methane into certain oil products at high pressures and temperatures. V. V. IPATIEV and V. P. TROTSKOYANIN: (Zhurn. Tverd. Topl., 1937, 8, 1137-1140).—The diffusion coeff. for H_2 into shale petrol, No. 1 petrol, No. 3 petrol, cracked naphtha, and kerosene, and for CH_4 into kerosene, are determined for 25°, 150°, and higher temp. and at pressures up to 300 atm. The coeff. increase with temp., but are unaffected by pressure changes and time. Velocities of dissolution with bubbling and stirring, respectively, are determined in a few cases. Graphs and tables are given and the apparatus is described. D. G.</p>																			
<p>ASS-5LA METALLURGICAL LITERATURE CLASSIFICATION</p> <p>1000 11102114</p> <p>101400 417 011 101</p> <p>1011111111</p> <p>101111 011 011 111</p>																			

2

Diffusion of gases in liquids under pressure. II
Effect of temperature on the diffusion of gases in liquids
under pressure. V. V. Ipat'ev, Jr., and V. P. Isakova;
vich. *J. Phys. Chem.* (U. S. S. R.) 10, 712-18(1937);
cf. *C. A.*, 28, 4004¹. — The diffusion coeff. of H_2 in H_2O was
determ. from 15° to 200°. The coeff. of diffusion is given by
the equation $D = 6.06 \times 10^{-10} \sqrt{t}$, where t = vol. of gas
diffused through interface, r = radius of bomb, S = area
coeff., t = time. From 30 to 135 atm. pressure D is pro-
portional to the pressure (within 15% error). The temp.
coeff. of diffusion is given by the equation $D = 1.58 \times 10^4$
 $e^{-E/RT}$, where $E = 8100$ Cal., or $\log D = 4.20 - 11000/T$.
The app. is described. P. H. Rathmann

<p>CA</p> <p>Electric conductivity of petroleum and petroleum emulsions. S. G. Lifshits and V. P. Tishchenko (Leningrad Inst. High Pressures). <i>Energ. Byull.</i> 1947, No. 8, 18-19 (in Russian). --The elec. cond. of samples of 3 types of petroleum and of their emulsions with H₂O contg. up to 50% H₂O was found to rise with the temp., between 20° and 90°, the faster the higher the H₂O content. An emulsion with 50% H₂O had a about 2-3 times greater than the dry petroleum; temp. rise from 25° to 90° increased a 10-20 times. To obtain correct values, it is necessary to maintain the emulsion through stirring or flow; the κ values measured under such conditions are lower than those calcd. by the equation of Fricke (C.A. 19, 545). Microscopic examn. of emulsions in an elev. field of 1000-2000 v./cm. showed alignment of water droplets in strings and merging of droplets into larger drops.</p> <p>N. Thon</p>																									
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																									

117 AND 118 (2011)		PROCESSING AND PROPERTY INDEX		119 AND 120 (2011)	
<p>The region of ultrahigh pressures. I. The equilibrium between the liquid and the vapor phases in the system hydrogen-benzene at pressures up to 3000 atmospheres. V. V. Ipat'ev, V. P. Teodorovich, A. P. Bratskin, and V. S. Artemovich (Inst. High Pressures, Leningrad). <i>Zhur. Fiz. Khim.</i> (J. Phys. Chem.) 22, 522-45 (1948).—Benzene (I) was brought in contact with compressed H₂, and H₂ was allowed slowly to bubble through it. The H₂ thus held, with I was passed through active C which kept I behind, and the vol. of remaining H₂ was measured. Also samples of the liquid phase were analyzed. The app. used is described. The mole fractions of I in liquid and vapor at 25° and 250, 500, and 1000 kg./sq. cm. were 0.940 and 0.0016, 0.886 and 0.0018, and 0.793 and 0.0024; at 50° and 250, 500, 1000, 2000, and 3000 kg./sq. cm. 0.933 and 0.0020, 0.873 and 0.0026, 0.771 and 0.0032, 0.685 and 0.0030, and 0.588 and 0.0119; at 70° and same pressures 0.924 and 0.0071, 0.858 and 0.0081, 0.748 and 0.0079, 0.604 and 0.0122, and 0.488 and 0.0170; at 100° and same pressures 0.910 and 0.0184, 0.830 and 0.0186, 0.697 and 0.0142, 0.580 and 0.0236, and 0.408 and 0.0332; and at 150° and 250, 500, 1000, and 2000 kg./sq. cm. 0.871 and 0.0405, 0.768 and 0.0412, 0.618 and 0.0472, and 0.429 and 0.0770. These data are expressed also as soly. of H₂ in I and as vol. concn. of I in the vapor phase. No measurement could be made at 25° and 2000 kg./sq. cm. because the condensed phase was solid under these conditions (but not at 25° and 1900 kg./sq. cm.). At 150° and 2000 kg./sq. cm. the compns. of the two phases were identical, i.e. the system was above its</p>					
<p>crit. temp. The mole fraction of I in the vapor phase has a min. at 500 kg./sq. cm. at several temps.; this is the effect discussed by Krichevskii and Kal'var'skaya (<i>C.A.</i> 25, 1083¹). The soly. follows the equation of Krichevskii and Kazarnovskii (<i>C.A.</i> 20, 932¹). A thermodynamic equation is derived for the effect of foreign compressed gas on the f.p. of a liquid. J. J. Nikerman</p>					
<p>ASS. SLA METALLURGICAL LITERATURE CLASSIFICATION</p>					
<p>FROM SYMBOLS</p>					
<p>117 AND 118 (2011)</p>					
<p>119 AND 120 (2011)</p>					

V. P. TEODOROVICH

Chemical Abstracts
May 25, 1954
Fuels and Carbonization
Products

①
Determination of the quality of sodium thioarsenate solutions. M. I. Gerber, V. P. Teodorovich, N. I. Brodskaya, and V. V. Ipat'ev. *Zhur. Priklad. Khim.* 26, 857-80 (1953). — Dctn. of the quality of $\text{Na}_2\text{HAS}_3\text{O}$ soln. (I) as a medium for removal of H_2S from gases contg. little CO_2 was studied in a lab. regeneration app. Regeneration cycle $\text{Na}_2\text{HAS}_3 + \frac{1}{2}\text{O}_2 = \text{Na}_2\text{HAS}_3\text{O} + \text{S}$ in the proper I is accomplished within 10-15 min. If I contains too much Na_2CO_3 regeneration may require several hrs. Part of elemental S changes into NaHS , which during regeneration is oxidized to $\text{Na}_2\text{S}_2\text{O}_3$. pH of fresh I was 7.75 and the amt. of O absorbed during regeneration was 2) ml./100 ml. of I; it pptd. 80.492 g./l. and formed $\text{Na}_2\text{S}_2\text{O}_3$ contg. 80.134 g./l.
F. J. Hendel

7-24-54
JJP

KERNQS, Yu.D.; BRODSKAYA, N.I.; ~~TEODOROVICH, V.P.~~

Comparative absorption characteristics of swampy ores of Leningrad
Province, the Tukan deposits and industrial by-products of the
Sterlitamak Soda Plant. Gaz.prem.no.10:9-13 O '56. (MIRA 9:10)
(Gases) (Sulfur) (Absorption)

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TEODOROVICH, V.P.

AUTHOR: Kolgatin, N.N., Glikman, L.A., Teodorovich, V.P. 32-9-21/43

TITLE: A Method for Long-Duration Tension Tests of Tube-Shaped Samples With Internal Hydrogen Pressures at High Temperatures (Metodika dlitel'nykh ispytaniy na razryv trubchatykh obraztsov pod vnutrennim davleniyem vodoroda pri vysokikh temperaturakh)

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol. 23, Nr 9, pp 1098-1101 (USSR)

ABSTRACT: A special plant and a special method of investigation, by which internal hydrogen pressures and the influence exercised by them on the refractoriness of the tubes (or, to be more accurate, upon their fatigue limit) are developed. There follows a description of the plants and of the experimental method. The sample is heated in an electric furnace up to the given temperature for 4-5 hours with a subsequent pause of 1 hour. Next, hydrogen is introduced through a valve until in the sample any pressure corresponding to the amount of tension in the walls of the sample is attained. The amount of this tension is computed according to a formula. In order to ascertain the influence exercised by hydrogen upon the fatigue limit analogous investigations were carried out in nitrogen. It is shown that hydrogen exercises a considerable influence upon the reduction of the fatigue limit of steel "20" at 400, 450 and 500°. At all test temperatures and different times needed for the tearing of

Card 1/2

32-9-21/43

A Method for Long-Duration Tension Tests of Tube-Shaped Samples With Internal Hydrogen Pressures at High Temperatures

the samples of steel "20" in hydrogen, the character of destruction was observed to be brittle. An investigation of the same type of steel in nitrogen during a relatively short duration of tearing showed that the destruction of the tubes was accompanied by considerable plastic deformation. It was found that the destruction of steel "20" with internal hydrogen pressure always takes place at the granular boundaries. The plant described permits a simultaneous investigation of a relatively large number of samples of tubes. There are 7 figures and 7 references, 3 of which are Slavic.

ASSOCIATION: Leningrad Institute for Petroleum Refining and for the Production of Artificial Liquid Fuels (Leningradskiy institut po pererabotke nefiti i polucheniyu iskusstvennogo zhidkogo topliva)
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Handwritten: 11:2
BRODSKAYA, N.I.; GERBER, M.I.; ~~TEODOROVICH, V.P.~~; SHUSHARINA, A.D.

Regenerating solutions of oxythioarsenic compounds. Zhur. prikl. khim.
30 no.11:1588-1593 N '57. (MIRA 11:2)

1. Leningradskiy nauchno-issledovatel'skiy institut po pererabotke
nefti i polucheniyu iskusstvennogo topliva.
(Solution (Chemistry)) (Arsenic compounds) (Sulfur)

VVEDENSKIY, A.A., otv.red.; MOLDAVSKIY, B.L., nauchnyy red.; BARKOVSKIY, I.V., vedushchiy red.; ALEKSEYEVA, K.A., red.; GADASKINA, N.D., red.; DEMENT'YEVA, M.I., red.; KAGANOVA, E.M., red.; KOBZLEV, V.A., red.; LEVIN, S.Z., red.; POKORSKIY, V.N., red.; TEODOROVICH, V.P., red.; SHMULYAKOVSKIY, Ya.E., red.; GERNAD'YEVA, I.M., tekhn.red.

[Collection of reports of scientific research carried out between 1950 and 1957] Sbornik referatov nauchno-issledovatel'skikh rabot, vypolnennykh v 1950-1957 gg. Leningrad, Gos.nauchno-tekhn. izd-vo nefi i gorno-toplivnoi lit-ry, leningr.otd-nis, 1958. 158 p. (MIRA 12:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefi i polucheniyu iskusstvennogo zhidkogo topliva.
(Petroleum research)

18(7)

06229

SOV/64-59-6-21/28

AUTHORS: Grebeshkova, I. D. and Teodorovich, V. P.,
Candidate of Chemical Sciences

TITLE: Metal Corrosion in Hydrogen Sulphide at High Temperatures

PERIODICAL: Khimicheskaya promyshlennost', 1959, Nr 6, pp 533 - 535 (USSR)

ABSTRACT: The present paper deals with work carried out under the supervision of Professor V. V. Ipat'yev (deceased). The subject mentioned in the title was investigated mainly on chromium steels as well as steels with molybdenum and tungsten additions, and a periodic weighing was carried out. At the same time, the scale on the samples was investigated microscopically as well as by chemical analyses. In a previous paper (Ref 5) an equation for the dependence on temperature of the corrosion rate of carbonaceous steels in hydrogen sulphide was derived. This equation can be represented as

$$\lg K = \frac{26220}{4.57T} + 8.4 \quad \text{for 10\% chromium steels, and } \lg K = -\frac{25760}{4.57T} + 7.2$$

for 20% chromium steels (Table 1, values for K). In the case of low-alloy chromium steels it can be assumed that the extent of corrosion is directly proportional to time. Microscopic investigations of the scale showed that the latter consists of two layers, an exterior layer of iron sulphide, and an interior one con-

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Metal Corrosion in Hydrogen Sulphide at High Temperatures⁰⁶²²⁹ SOV/64-59-6-21/28

taining all the oxidized chromium. In a second of experiments steels with 1-18% of chromium and 5 and 10%, or 5 and 14% of tungsten were investigated along with steel grades EI-579, Kh7SMT, and NML. The experiments were carried out at 500°, a partial pressure of hydrogen sulphide of 0.8 atm., and a duration of 235 and 500 hours, and the above constants were calculated (Table 2). Steels with 10-12% chromium are unstable in hydrogen sulphide at 500°, and an addition of up to 14% tungsten and up to 10% of molybdenum does not increase the resistance. Again, a double scale layer forms, but in contrast with chromium steels the inner layer is loose in the case of molybdenum and tungsten steels and shows no protective effect. There are 2 tables and 5 references, 1 of which is Soviet.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut neftekhimicheskikh protsessov (All-Union Scientific Research Institute for Petroleum-chemical Processes)

Card 2/2

BEZDEL', L.S.; TEODOROVICH, V.P.

Solubility of carbon dioxide, hydrogen sulfide, methane, and
ethylene in methanol at low temperatures. Gaz. prom. no.8:38-43
Ag '58. (MIRA 11:8)

(Gases) (Methanol)

GERBER, M.I.; TEODOROVICH, V.P.; SHUSHARINA, A.D.

Rate of absorption of hydrogen sulfide by solutions of arsenic trioxide
and sodium carbonate. Zhur. prikl. khim. 31 no.10:1478-1483 0 '58.
(MIRA 12:1)

1. Leningradskiy nauchno-issledovatel'skiy institut po pererabotke
nefti i polucheniyu iskusstvennogo zhidkogo topliva.
(Hydrogen sulfide) (Absorption)

BRODSEKAYA, N.I.; TEODOROVICH, V.P.

Possibility of substituting waste lye for soda ash in the
arsenic-sodium process of gas purification. Gaz.prom. no.11:
19-20 N '58. (MIRA 11:11)
(Gas purification) (Lye)

GERBER, M.I.; TEODOROVICH, V.P.; SHUSHARINA, A.D.

Investigation of the rate of absorption of hydrogen sulfide by
solutions containing arsenic and soda. Zhur.prikl.khim. 31 no.11:
1624-1627 N '58. (MIRA 12:2)

1. Leningradskiy nauchno-issledovatel'skiy institut po pererabotke
nefti i polucheniyu iskusstvennogo zhidkogo topliva.
(Hydrogen sulfide) (Solution (Chemistry)) (Absorption)

SKOP, S.L.; TEODOROVICH, V.P.; IPAT'YEV, V.V.

Removal of carbon from carbon steel by hydrogen at high temperatures and pressures. Zhur.prikl.khim. 31 no.12:1894-1897 D '58. (MIRA 12:2)

1. Leningradskiy nauchno-issledovatel'skiy institut po pererabotke nefi i polucheniyu iskusstvennogo zhidkogo topliva.
(Steel--Testing) (Hydrogen)

IPAT'YEV, V.V.; MERKULOVA, O.P.; TEODOROVICH, V.P.

Investigation of the rate of the removal of carbon from 30KhMA
steel pipes in a hydrogen atmosphere. Zhur.prikl.khim. 31 no.12:
1891-1894 D '58. (MIRA 12:2)

1. Leningradskiy institut po pererabotke nefi i polucheniyu
iskusstvennogo zhidkogo topliva. (Pipe, Steel)
(Hydrogen)

SOV/129-59-3-5/16

AUTHORS: Kolgatin, N.N., Engineer, Glikman, L.A., Doctor of Technical Sciences, Professor, Teodorovich, V.P., Candidate of Chemical Sciences and Deryabina, V.I., Engineer

TITLE: Sustained Strength of Steels During Investigation of Tubular Specimens Subjected to an Internal Pressure of Hydrogen at Elevated Temperatures (Dlitel'naya prochnost' staley pri ispytani trubchatykh obraztsov pod vnutrennim davleniyem vodoroda pri vysokikh temperaturakh)

PERIODICAL: Metallovedeniye i Termicheskaya Obrabotka Metallov, 1959, Nr 3, pp 19 - 24 (USSR)

ABSTRACT: A.A. Zakharov (Ref 1) and Sh.N. Kats (Ref 2) have established that in certain calculations of the stresses in tubes subjected to internal pressures by a neutral medium, the sustained strength at elevated temperatures equals the sustained strength in ordinary tensile tests. Therefore, it is possible to use the results of sustained tensile tests for calculating the permissible stresses. In a number of cases, the permissible stresses can be chosen correctly only by taking into consideration the

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SOV/129-59-3-5/16

Sustained Strength of Steels During Investigation of Tubular
Specimens Subjected to an Internal Pressure of Hydrogen at
Elevated Temperatures

influence of the aggressive media which produce the internal pressures inside the tubes at the particular elevated temperatures. Of such aggressive media, hydrogen is of considerable importance. The authors of this paper have produced a test rig and evolved a method of testing for sustained failure of tubular specimens which are subjected to internal pressure of various media at elevated temperatures. This test rig has been described in earlier work of some of the authors of this paper (Ref 3). In the here described work it was applied for studying the sustained strength of tubular specimens of various steels subjected to internal pressure of hydrogen and nitrogen at elevated temperatures. As a neutral medium, molecular nitrogen was chosen which enabled evaluating the influence of hydrogen on the sustained strength of the tubes. The chemical compositions and the mechanical properties of the investigated (8) steels are entered in Tables 1 and 2. In addition to these, steel containing 6% Cr

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SOV/129-59-3-5/16

Sustained Strength of Steels During Investigation of Tubular Specimens Subjected to an Internal Pressure of Hydrogen at Elevated Temperatures

and supplementary additions of W, V, Mo and Nb was studied. Of the eight materials enumerated in Table 1, the tests on commercial iron were carried out at 450 °C and the respective results are graphed in Figure 1. A sharp drop in the sustained strength was observed for tubular specimens subjected to internal pressure of hydrogen; brittle failure with a pronounced intercrystallite character was observed, whilst in equal specimens subjected to internal pressure with nitrogen the failure was accompanied by appreciable plastic deformation and the failure was intracrystalline. The results for the other materials tested are also graphed. On the basis of the measured strength data for sustained loading for durations of 1 000 and 10 000 hours, it can be concluded that hydrogen has a considerable influence on the reduction of the sustained strength, particularly in the case of commercial iron and steel 20; at 450 °C these materials suffered a loss of 75 to 85% of their sustained strength. For low and medium-alloy steels

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SOV/129-59-3-5/16

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the drop in sustained strength was lower, amounting to 22 to 40% at 600 °C. Of the investigated low- and medium-alloy steels, the Soviet steel EI579 had the highest sustained strength at 600 °C, when subjected to hydrogen and nitrogen under pressure. An interesting feature of the results was that for this steel the sustained strength dropped with increasing wall thickness of the tubular specimens and this is attributed not only to the influence of size factor and surface defects but also to the more intensive influence of hydrogen as a result of the higher pressures which were applied to the thick-walled tubes (400 to 500 kg/cm² for wall thicknesses of 1.5-2 mm and 600 to 900 kg/cm² for wall thicknesses of 7 mm). The drop in sustained strength during loading by hydrogen under pressure at 600 °C was much lower (3-9% and 10-20%, respectively) for the high-alloy steels Kh12VMF and 1Kh18N9T. It can be considered an established fact that a drop in the

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SOV/129-59-3-5/16

Sustained Strength of Steels During Investigation of Tubular Specimens Subjected to an Internal Pressure of Hydrogen at Elevated Temperatures

sustained strength as a result of loading with hydrogen under pressure at elevated temperatures and pressures is caused basically by gradual "loosening" of the grain boundaries and weakening of the bonds between the crystallites which determine the sustained strength.

There are 10 figures, 2 tables and 3 Soviet references.

ASSOCIATION: Leningradskiy nauchno-issledovatel'skiy institut po pererabotke nefti i polucheniya iskusstvennogo zhidkogo topliva (Leningrad Scientific Research Institute on Petroleum Refining and on the Production of Synthetic Liquid Fuels)

Card 5/5

GLIKMAN, L.A., doktor tekhn.nauk, prof.; KOLGATIN, N.N., inzh.; TEODOROVICH,
V.P., kand.khimicheskikh nauk; DERYABINA, V.I., inzh.

Changes in the mechanical properties of certain steels under
the effect of hydrogen at high temperatures and pressures.
Metallovedenie 3:58-73 '59. (MIRA 14:3)
(Steel—Hydrogen content)
(Metals at high temperature)

HEZDEL', L.S.; TEODOROVICH, V.P.

Studying the absorption rate of CO₂ and H₂ S by methyl
alcohol in a countercurrent column at low temperatures.
Gas. prom. 4 no.7:29-33 J1 '59. (MIRA 12:10)
(Carbon dioxide) (Hydrogen sulfide) (Absorption)

IPAT'YEV, V.V. [deceased]; TEODOROVICH, V.P.; GREBESHKOVA, I.D.; MERKULOVA, O.P.

Corrosion of metals in hydrogen sulfide at high temperatures. Khim.
sera-i azotorg.sod.sod.v nefte.i nefteprod. 3:419-430 . '60. (MIRA 14:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut neftekhimicheskikh
protssessov.

(Metals—Corrosion) (Hydrogen sulfide)

188200

26051
8/137/6./000/007/068/072
A060/A101

AUTHORS: Glikman, L. A.; Teodorovien, V. P.; Kolgatin, N. N., Deryabina, V. I.

TITLE: Mechanical properties at room temperature of Armco iron and certain steels hydrogenated at high temperatures

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 7, 1961, 6, abstract 7133 (in the collection: "Khimiya sera- i azotorgan. soedineniy, soderzhashchykh v neftyakh i nefteproduktakh". v. 3, Ufa, 1960, 431-438)

TEXT: The influence of hydrogen was investigated upon Armco iron with composition (in %): C 0.03, Si 0.19, Mn 0.25; St 20 at 400 and 450°C - C 0.23, Si 0.34, Mn 0.47, Cr 0.15, Ni 0.15 and on alloy steels X12BMφ (Kh12VMF) - C 0.17, Si 0.22, Mn 0.64, Cr 13.5, V 0.2, W 0.86, Mo 0.46; X18H9T (1Kh18N9T) - C 0.12, Si 0.74, Mn 1.15, Cr 17.25, Ni 10.35, Ti 0.45 and 45Г18Н03 (45Г18Н03) - C 0.45, Si 0.53, Mn 17.8, As 3.17. Besides, 6 pc Cr steel with additional traces of V, W, Mo and Nb (X6BMφБ [Kh6VMFB]) was investigated. Almost in all H saturated specimens of Armco iron and St.20 the σ_s (flow surface) is absent at tension.

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AO60/A101

Mechanical properties at room temperature ...

Subsequent normalizing restores the flow surface. σ_b for St. 20 is reduced by half as result of the hydrogen action, and ductility is almost completely absent. As result of the heat aftertreatment, σ_b , δ , ψ are increased but their values remain below the original values. After the hydrogen saturation a_k is greatly lowered. The crushing of hydrogen saturated Armeo iron and St. 20 occurs with manifestation of a brittleness effect at the grain boundaries without noticeable traces of plastic deformation. Steel 450.8Yu is particularly subject to hydrogen crushing: σ_b decreases from 88.8 to 45 kg/cm², σ_s - from 65.0 to 38.0 kg/cm², δ - from 39.2 to 7.2 %, ψ - from 62.0 to 9.0%, and a_k - from 12.9 to 2.2 kg-m/cm². The strength properties of 6 ps Or steel, Kh12VMF and 1Kh18N9T decrease slightly but the ductility properties decrease noticeably.

T. Romyantseva

[Abstracter's note: Complete translation]

Card 2/2

GLIKMAN, L.A.; TEODOROVICH, V.P.; KOLQATIN, N.N.; DERYABINA, V.I.

Long-duration strength of some steels in the testing of tubular
specimens under internal pressure of hydrogen at high temperatures.
Khim.sera-i azotorg.sod.sod.v nefi.i nefteprod. 3:439-450 '60.
(MIRA 14:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut neftekhimicheskikh
protseessov. (Steel--Testing) (Hydrogen)

MERKULOVA, O.P.; NEMIROVSKIY, A.N.; PREYS, M.O.; TEODOROVICH, V.P.

Some considerations on the corrosion of equipment of pressure distillation units used for processing shale tar. Khim. i tekhn. gor. slan. i prod. ikh perer. no.9:114-131 '60. (MIRA 15:6)
(Oil-shale industry--Equipment and supplies)
(Distillation apparatus--Corrosion)

18.7103

77503
SOV/80-33-1-17/49

AUTHORS: Archakov, Yu. I., Grebeshkova, I. D., Teodorovich, V. P.

TITLE: The Effect of Heat Treatment on Decarburization and Cracking of Steels While Under Hydrogen at 500-600° C and 800 kg/cm² Pressure

PERIODICAL: Zhurnal prikladnoy khimii, 1960, Vol 33, Nr 1, pp 89-94 (USSR)

ABSTRACT: This study was started under the supervision of Professor V. V. Ipat'yev. Steel of type 40X (0.41% C; 0.85% Cr) and melt 7475 (0.18% C; 3.05% Cr) were hardened and subsequently tempered at various temperatures which allowed the obtaining of various Cr-content in the carbide phase and solid solution. The tests were made in an autoclave under hydrogen pressure of 800 atm. The carbon content, structure, and composition of the carbide phase before and after the tests were determined. The composition of the carbide phase was determined by means of the electrolytic dissolution (N. M. Popova, Carbide Analysis of Steel--Karbidnyy analiz stali--,

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The Effect of Heat Treatment on Decarburization and Cracking of Steels While Under Hydrogen at 500-600° C and 800 kg/cm² Pressure

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307/80-33-1-17/49

Oborongiz, 1957) and by means of chemical, and in some instances, X-ray analysis. It was established that the amount of chromium in the carbide phase increased with the tempering temperature, and the rate of decarburization decreased. Practically full decarburization was achieved with tempering temperature equal to 550-700° C. Metallographic investigation showed that the size of microscopic cracks appearing along the grain boundaries increased with the tempering temperature and with the chromium content in the carbide phase. It was found that steel with 0.18% C alloyed with up to 3% Cr resisted the corrosive action of hydrogen better than steel 40X. The investigated steels showed low resistance, however, at 600° and 800 atm hydrogen pressure; evidently, the amount of the alloying elements was insufficient to bind all the carbon into carbides. Addition of 0.5-1.0% molybdenum to steel with 0.16% C and 3% Cr did not increase its resistance against the action of hydrogen

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The Effect of Heat Treatment on Decarburization and Cracking of Steels While Under Hydrogen at 500-600° C and 800 kg/cm² Pressure

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under the above-mentioned conditions. It was also found that a new phase, a so-called "carbide precipitate," was formed in all decarburized steels on electrolytic dissolution. In chromium steels, this precipitate contained considerable amounts of chromium, and in chromium-molybdenum steels, considerable amounts of Cr and Mo. This new phase requires further studies. There are 2 tables; 1 figure; and 3 references, 1 U.K., 1 German, 1 Soviet. The U.K. reference is: N. Inglis, W. Andrews, J. Ir. St. Int., 128, 383 (1933).

ASSOCIATION: All-Union Scientific Research Institute for Petrochemical Processes (Vsesoyuznyy nauchno-issledovatel'skiy institut neftokhimicheskikh protsessov)

SUBMITTED: January 20, 1959

Card 3/3

S/737/61/000/000/003/010

AUTHORS: Archakov, Yu.I., Grebeshkova, I.D., Teodorovich, V.P.

TITLE: Hydrogen corrosion of ferrochromium alloys at hydrogen pressure of 400-800 kg/cm² and a temperature of 600°C.

SOURCE: Stal', sbornik statey. Ed. by A.M. Yampol'skiy. Moscow. 1961, 424-435.

TEXT: Experimental findings show that the effect of H on ferrochromium (FC) alloys on the stability of the carbide component therein is not controlled by the ratio of the C and Cr contents alone. FC alloys with a C content < 0.4% are H-corrosion resistant at T=600°C and p_H=800 kg/cm², provided the Cr content is > 9%. Decarbonization of the alloy occurs at the said temperature and pressure, even when only trigonal Cr carbide (Cr,Fe)₇C₃ is present. A brief state-of-the-art report on the H-corrosion problem of C steel and means for its minimization are given. The objective of this study is an investigation of the H corrosion of various FC alloys under more severe conditions than those employed in antecedent investigations. The tests defined in the title were conducted for a period of 1,000-4,000 hours. The specimens were fully exposed (on all sides, not only along an interior cavity) to the H pressure. The method used for the investigation of the

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Hydrogen corrosion of ferrochromium alloys...

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effect of the alloy composition on the H-corrosion process was that of Yu.I. Archakov (Leningradskiy tekstil'nyy institut im. Lensovet. Trudy, no. 38, Goskhimizdat, 1957), except for a thermostatically controlled electric furnace in which a 36-mm OD, 18-mm ID, tube of 1X18H9T (1Kh18N9T) steel was set to serve as a H-pressurized reaction tank. Fresh H was circulated from one end of the reaction tube once a day to replace any H that might have diffused through the tube and to eliminate any traces of methane that might have formed. The degree of H corrosion was judged before and after soaking by microscopic examination, mechanical testing, and chemical analysis for C. The pre-test heat treatment of various FC-alloy specimens is tabulated. The carbide phase was analyzed chemically and by X-ray before the test. The precipitate was separated electrolytically and chemically, and the Cr and Fe contents were determined in the precipitate and in the separate carbide components. A tabulation of the data obtained by N.M. Popova's method (Karbidnyy analiz stali - Carbide analysis of steel. Oborongiz, 1957) and by N.A. Saverina's method (TsNIITMash, book 36, Mashgiz, 1950) is adduced for 9 alloys, and the two methods are briefly defined. X-ray analysis revealed the presence of the Me_7C_3 with hexagonal lattice, the $Me_{23}C_6$ phase, and some weak lines of an unknown phase. The changes in mechanical properties after H soaking are tabulated for the two series of tests performed at increasing H pressures and longer soaking times. FC alloys with an initial C:Cr ratio of 1:25 and 1:29 were

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totally decarbonized by the H. Alloys with a C:Cr ratio as high as 1:35 were still partly decarbonized. Yet, an alloy with a C:Cr ratio of only 1:24 exhibited only an insignificant surficial decarbonization under the most severe testing conditions. It was concluded that the C:Cr-ratio criterion alone (cf. Inglis, N., Andrews, W., Journal of the Iron & Steel Institute, v. 128, 1933, 383-408, and 2 Soviet references) is inadequate, but that a definite Cr threshold value of 9% is a dependable criterion for the H-corrosion stability of FC alloys containing up to 0.4% C and a $(Cr, Fe)_7C_3$ carbide component. There are 3 figures, 5 tables, and 13 references (9 Russian-language Soviet, 2 English-language, 2 German).

ASSOCIATION: Vsesoyuznyy n.-i. institut neftekhimicheskikh protsessov
(All-Union scientific research institute for petrochemical processes).

Card 3/3

18.8300 1138, 1454

23149
S/184/61/000/002/004/008
A110/A033

AUTHORS: Archakov, Yu. I., Candidate of Technical Sciences; Teodorovich, V. P.
Candidate of Chemical Sciences

TITLE: On the problem of the beginning of hydrogen corrosion of steel

PERIODICAL: Khimicheskoye Mashinostroyeniye, no. 2, 1961, 35 - 38

TEXT: The purpose of this paper was to investigate the conditions marking the beginning of hydrogen corrosion of carbon and 30XMA(30KhMA) steels at temperatures of 200 - 300°C. The issue is of great importance as, if it is known when decarbonization is due to set in, it is possible to determine the service life of equipment and pipes operating under various conditions. The dependence of the incubation period on the hydrogen pressure and temperature of 35 steel is expressed by

$$\tau_0 = \frac{e^{\frac{13330}{T}}}{p^{3/2} C} \quad (1)$$

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On the problem of the beginning of

T - temperature in °K; p - hydrogen pressure in atm; C - constant (lgC = 3.4).
For 30XMA (30KhMA) steel these dependencies are

$$\lg T_0 = \frac{11900}{T} - \frac{e}{3.1} - \frac{p}{C_1} \quad (2)$$

C - constant (lgC₁ = -3.04). Figure 1 shows incubation values of carbon and 30XMA (30KhMA) steels calculated according to Formula (1) and (2), compared to experimental data. Due to the effect of numerous other factors the temperature limit of the beginning of hydrogen corrosion may vary by 50 - 100°C. N. Ingles and W. Andrews (Ref. 3: "J. Iron and Steel Inst." vol. 53, No. 128, 1933) present results of investigations carried out on 13 mm tubes 56 mm in diameter at 250 - 270°C and 250 atm, after exposure to hydrogen. Steel containing 0.12% C with 15.000 μ² grains remained unaffected after 1,200 hours; after 3,200 hours the depth of decarbonization was 3.8 mm. Identical steel with 500 μ² grains showed

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no signs of decarbonization after 8,800 hours, which confirms the accuracy of calculations of the length of the incubation period according to Formula (1), i.e. 10,000 hours for fine-grained steel. According to the same formula, the incubation period of carbon steel is 50,000 hours at 220°C and 800,000 hours at 170°C. P. S. Perminov (Ref. 4: "Corrosion and its Prevention", vol. 2, no. 1, 1936) states that the tendency to fractures grows proportionally to the increasing carbon content of steel, owing to differing specific volumes of cementite and ferrite. Ref. 4 also contains data on the begin of hydrogen corrosion of carbon steel at various temperatures and pressures (Figure 2). From reports contained in References 3 and 4 follows, that at pressures up to 500 atm the lower temperature limit of hydrogen effect on carbon steel lies around 200°C. These results have been confirmed by tests carried out by the Gosudarstvennyy Institut Vysokikh Davleniy, GIVD (State Institute of High Pressures) in 1940. Grade "25" steel pipes were fully decarbonized after 1.5 years of operation in a nitrogen-hydrogen-ammonia medium at 300 atm and 450 - 525°C. Similar corrosion appeared in grade "20" steel subjects to the same medium at 200 atm. The unreliability of short-term tests is demonstrated by means of results obtained by the GIVD with grade "20" steel, and by a non-specified ammonia plant with carbon steel. According to the

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author's calculations, the incubation period of grade "20" steel should be 10,000 hours at 150 - 250°C and 275 - 300 atm. Data obtained by F. Nauman (Ref. 5, "Steel and Iron", vol. 57, no. 32, 1937) is considered unreliable because of the briefness of pertinent tests (100 hours). Production experiments confirm the accuracy of results given in Ref. 4, and established temperature limits and hydrogen pressure in respect of various steels listed by G. A. Nelson (Ref. 14: "Trans the ASME", February, 1951). According to O. van Rossum (Ref. 11: "Chem. Ing. Eng. ug Techn." vol. 25, no 8/9, 1953). Inner stresses and preliminary cold working decrease the hydrogen resistance of steel, consequently carbon steel should not be used under pressures exceeding 300 atm and temperatures above 220°C. This statement is borne out by the findings given in References 4 and 14 and appears in respect of smaller machine parts made of fine-grained steel. The longer the soaking of samples in hydrogen, the lower the temperatures and pressures at which fractures take place. The use of carbon steel in the shape of coarse-grained large billets is particularly dangerous. Temperatures up to 150°C are considered safe for carbon steel equipment used in hydrogenation plants. For short-term operations at higher temperatures, the strength of machinery and pipe walls should be selected taking into account hydrogen corrosion. The effective power of the

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On the problem of the beginning of

activated decarbonization process in respect of chromium and molybdenum alloyed steels increases from 7,200 cal/g-atom ("20" steel) to 15,000 cal/g-atom (30KhMA steel). Figure 4 shows the dependency of decarbonization depth Δl on pressure p for various pipe walls: Yu. I. Archakov, (Ref. 15: "Journal of Applied Chemistry", vol. 33, no. 11, 1960) developed an equation linking the depth of decarbonization with pressure, temperature, wall strength and inside radius of a "20" steel pipe

$$\Delta l = Ae^{-\frac{E}{RT}} \tau^a p^n \delta^m R_2^\mu \quad (3)$$

Δl - depth of decarbonized layer; T - absolute temperature in $^{\circ}K$; τ - duration in hours; p - hydrogen pressure in kg/cm^2 ; δ - strength of walls and machinery casings in mm; R_2 - inside radius of pipe in mm; e - base of natural logarithms; $E = 7,200$ cal/g-atom effective power of activated decarbonization process; $R = 1.987$ cal/g-atm $^{\circ}C$, gas constant; $A = 0.0076$; $a = 0.5$; $n = 1.12$; $m = 0.71$; $\mu = 0.58$. Equation (3) is applicable only after completion of the incubation period, i.e., during the decarbonization process. The empirical equation applies

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23149

S/184/61/000/002/004/008
A110/A033

On the problem of the beginning of

to 4, 7, 10 and 12 mm pipes with inside diameters of 4, 8, 10, 16 and 18 mm. According to V.V. Ipat'yev et al (Ref. 1: Zhurnal prikladnoy khimii, vol. 31, no. 12, 1958) the kinetic aspect of decarbonization of 30XMA (30KhMA) steel is expressed by

$$\lg K = - \frac{15,000}{2,3RT} + 0.0034 p + 1.13 \quad (4)$$

$K = \frac{\Delta l}{1 \sqrt{\tau}}$, showing the ratio of the decarbonization rate of 30 XMA(30KhMA)

steel pipes to the pressure and temperature. Equation (4) makes it possible to determine the rate and depth of decarbonization of 24 x 7 mm 30XMA (30KhMA) pipes and the approximative computation of their service life, depending on operating conditions. All equations are applicable to hydrogen affected steel pipes. Under production conditions the steam-gas mixture contains 50 - 80 % (volumetric) hydrogen; the rest are hydrocarbons which delay hydrogen corrosion. The resistance to hydrogen corrosion of carbon steels exposed to high temperatures and pressures can be improved by addition of strong carbide-forming elements, of which the increase of chromium content proved most effective. Tests proved that a slow de-

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carbonization process takes place already at 200 - 250°C, consequently the safe operation range for carbon steels in hydrogen media at 300 kg/cm² pressure is limited to temperatures not exceeding 150°C. 30XMA(30KhMA) chromium-molybdenum steel can be used in hydrogenation plants and subjected to 300 kg/cm² hydrogen pressures at 300°C. There are 6 figures and 16 references; 10 Soviet-bloc and 6 non-Soviet-bloc. The reference to the English-language publication reads as follows: G. A. Nelson "Trans the ASME, February 1951; Oil and Gas Journal, vol. 57, no. 22, 1959.

X

Card 7/9

S/064/61/000/003/008/009
B101/B203

AUTHORS: Mayorov, D. M., Merkulova, O. P., Mushenko, D. V.,
Teodorovich, V. P.

TITLE: Selection of material for the apparatus of direct hydrogenation of higher fatty acids

PERIODICAL: Khimicheskaya promyshlennost', no. 3, 1961, 62-64

TEXT: In connection with the development of the production process of higher aliphatic alcohols by direct hydrogenation of fatty acids, the problem of selecting suitable corrosion-resisting material for the apparatus arose. The present paper reports on corrosion tests. Two methods were applied: 1) To select the material for the hydrogenation vessel and the separator, metal specimens were tested directly in the reaction vessel of the hydrogenation plant at 340°C, 300 atm, or in the separator. After testing for 1978 hr, the following corrosion rates (mm per year) were found: CT-20 (St-20) steel 7.0; 1X13 (1Kh13) steel 0.4; 1X18H9T (1Kh18N9T) steel 0.002; 1X18H12M2T (1Kh18N12M2T) 0.01; ЭИ-435 (EI-435) 0; industrial aluminum 0.08. 2) The material for the heat exchangers was

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B101/B203

tested by heating the specimens with the fatty acids ($C_7 - C_{20}$) in an autoclave at 5 atm hydrogen pressure up to 150°C . For less important parts, they were heated in a thermostat to 50°C . Table 5 gives the experimental data (mm per year). Testing of the electrically welded seams (analysis of electrodes, Table 4) by method 2 showed that the seams were also resistant. In a test plant, various metals were tested for corrosion resistance during hydrogenation of $C_7 - C_9$ and $C_{10} - C_{16}$ acids at 230°C and 300 atm. It was found that steels with 18-20% Cr were sufficiently resistant. Test results of metals and welding seams at 100° and 150°C in an autoclave are given in Table 8. The widely used 1Kh18N9T steel proved to be suitable. Testing for intergranular corrosion ($t = 230^{\circ}\text{C}$, $p = 300$ atm) of untreated and thermally treated specimens of this steel showed corrosion rates of 0.001 mm/year in both cases. A hydrogenation apparatus made of this steel has been operating 4 years now. Low-alloy steels (EI-579) are suited for temperatures up to 50°C . For temperatures between 70 and 150°C , the steel must contain at least 1% of chromium. Aero-fireclay bricks proved to be stable in tests during 200 hr at 100 and 150°C in the presence of $C_{10} - C_{16}$ acids. There are 9 tables

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Selection of material for ...

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and 1 Soviet-bloc reference.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut neftekhimicheskikh protsessov (All-Union Scientific Research Institute of Petrochemical Processes)

Таблица 4

Химический состав наплавленного металла электродов, использованных для сварки сталей 1X18H9T и 1X18H12M2T (%)

Тип наплавленного металла	C	Si	Mn	Cr	Ni	Mo	V	Nb	S	P
ЦП-11	0,12	0,95	1,90	19,7	9,40	—	—	0,9	0,008	0,02
ЭНТУ-3	0,12	1,04	1,58	19,3	10,33	1,87	—	—	0,004	0,015
КТИ-5	0,08	0,36	3,80	21,0	11,15	1,99	0,55	—	0,01	0,017
ЦТ-15	0,09	0,27	1,73	19,5	9,70	—	—	0,9	0,007	0,011

Table 4

Legend to Table 4: 1) Type of metal welded-on. 2) TsL-11. 3) ENTU-3. 4) KTI-5. 5) TsT-15.

Card 3/5
2

MAYOROV, D.M.; MERKULOVA, O.P.; MUSHENKO, D.V.; TEODOROVICH, V.P.

Selection of materials for the units performing the direct hydrogenation of higher fatty acids. Khim.prom. no.3:210-212 Mr '61.

(MIRA 14:3)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut neftekhimicheskikh protsessov.

(Acids, Fatty) (Hydrogenation)

KOLGATIN, N.N.; VANSHENKER, V.R.; TEODOROVICH, V.P.; DERYABINA, V.I.

Device for recording stress-deformation for attachment to the
P-5 universal machine. Zav.lab. 27 no.5:616-617 '61. (MIRA 14:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut neftekhimicheskikh
professov.

(Testing machines)

188100

1413, 1418, 2808, 4016

26864
S/080/61/034/004/005/012
A057/A129

AUTHORS: Archakov, Yu. I., Grebeshkova, I. D., Teodorovich, V. P.

TITLE: Determination of the rate of hydrogen diffusion through 1X18H9T (1Kh18N9T) steel at high temperatures and pressures

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 4, 1961, 821 - 825

TEXT: A method was developed for determining the hydrogen permeability of 1Kh18N9T (AISI 321) steel under high-temperature (up to 1,000°C) and high-pressure (up to 300 kg/cm²) conditions. It was found that the pressure dependence of the hydrogen diffusion rate is parabolic and the temperature dependence is exponential, having a temperature coefficient of 21,650 cal·g⁻¹·atom⁻¹. The method allows diffusion rates through metals at high temperatures and pressures to be determined with sufficient accuracy. It is essential that welding joints can be avoided and the amount of diffused gas can be measured. The present investigation was necessary since literature data refer only to tests at high temperature and low pressure or vice versa. No data are available for high-temperature and high-pressure conditions. In the method presented tubular samples (Figure 1) are used without welding joints and temperature and pressure were kept constant during

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S/080/61/034/004/005/012
A057/A129

Determination of the rate

the test. The testing assembly contained the diffusion unit, placed into an electric oven, a high-pressure system and the device for measuring the amount of diffused hydrogen. In all experiments technical grade hydrogen gas was used. The sample (Figure 1) was installed into the diffusion unit by welding the hydrogen gas inlet-tube at point E to the sample and inserting the sample into a vertical cylindrical tube which was placed in the vertical electrical oven. Hydrogen gas thus entered into the sample and diffusion occurred through the walls between C-D (see Figure 1). From the cylindrical tube the diffused hydrogen passed through an outlet-tube to the gas-measuring device. The high-pressure assembly used in the present experiments was described in a previous paper (Ref. 10: Tr. LTI. im. Lensoveta, Goskhimizdat, XXXVIII, 204-215, 1957; Ref. 11: ZhPKh, 32, 12, 2667, 1959). The temperature was regulated during the experiments by means of a ЭДП-17 (EDP-17) electronic potentiometer and registered by a ЭПП-09 (EPP-09) automatic electronic potentiometer. The amount of diffused hydrogen was measured in a device containing for smaller gas amounts a 2 cm³ microburet calibrated in 0.01 cm³, while for greater gas quantities a 100 cm³ buret graduated in 0.2 cm³ was used. Measurements were carried out in certain time interval and the amount of diffused gas was estimated per time unit and for normal conditions. The observation made by P.L. Chang et. al. (Ref. 3: J. Iron and Steel Inst., 3, 170, 205, 1952) that

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S/080/61/034/004/005/012

A057/A129

Determination of the rate

stationary gas diffusion is quicker attained by cooling the sample was proved in preliminary experiments in the present work. Thus diffusion characteristics were estimated starting at high temperatures. The present tests were carried out on 6 tubular samples made of 1Kh18N9T steel. The following temperatures and pressures were investigated: 500°C and 300 kg/cm², 600 - 800°C up to 200 kg/cm², at 900°C up to 100 kg/cm², 950°C up to 75 kg/cm², and at 1,000°C up to 50 kg/cm². The maximum difference in the results between the six investigated samples was 5 %. The results shown in Figure 3 and in a table indicate a parabolic diffusion rate. In Figure 4 the temperature dependence of the diffusion rate is demonstrated. Since all isobars in Figure 4 are parallel to each other, the dependence can be expressed by $V = k \cdot e^{-21650/RT}$. Thus the apparent activation energy, estimated from the inclination angle, is 21,650 cal·g⁻¹·atom⁻¹. H. Bennek and G. Klotzbach (Ref. 1: Stahl und Eisen, 61, 25, 597, 1941) found for the diffusion of hydrogen at high temperature and 1 atm pressure through 18 % Cr, 8.9 % Ni steel an activation energy of 18,850 cal·g⁻¹·atom⁻¹. There are 4 figures, 1 table and 11 references: 4 Soviet-bloc and 7 non-Soviet-bloc. ✓

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut neftekhimicheskikh protsessov (All-Union Scientific Research Institute of Petrochemical Processes)

Card 3/5

S/184/62/000/003/001/004
D040/D113

1P. P300

AUTHORS: Deryabina, V.I., Engineer; Kolgatin, N.N., Candidate of Technical Sciences; and Teodorovich, V.P., Candidate of Chemical Sciences

TITLE: The effect of hydrogen on the long-term strength of steel tubes

PERIODICAL: Khimicheskoye mashinostroyeniye, no.3, 1962, 22-26

TEXT: Heated tubular specimens of iron and 10 steel grades were tested for 1,000 and 10,000 hrs under a 47-780 kgf/cm² stress produced by hydrogen pumped into specimens at different pressure. Tests were conducted in view of hydrogen embrittlement of chemical and petroleum-processing equipment and insufficient data on the combined effect of stresses and hydrogen. The test results are illustrated and described. The long-term strength dropped 70-85% in iron and steel 20 at 400 and 450°C, 30-60% at 600°C in 30XMA(30KhMA), 12XMΦ(12KhMF), HM1(NM1), X3BMΦ(Kh3VMF) and X6BMΦ5(Kh6VMFB) medium-alloy steels, but much less in X12BMΦ(Kh12VMF), 1Г18Х8Т(1Г18Kh8T) and 1Х18Н9Т(1Kh18N9T) high-alloy steels. The detrimental effect of hydrogen on all the studied steels

✓B

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S/184/62/000/003/001/004
D040/D113

The effect of hydrogen ...

increased as the test time increased. The fracture was intercrystalline and brittle when the strength was strongly affected by inner hydrogen pressure; gradual "loosening" of the grain boundaries was visible under a microscope. Tests with nitrogen resulted in stretched metal grains and intercrystalline cracks. The Kh12VMF, 1G18Kh8T and 1Kh18N9T steels had intercrystalline fractures and micro- and macroscopic deformation in tests with both hydrogen and nitrogen. It is expected that the effect on these steels will be greater during longer tests. There are 10 figures and 3 tables.

✓B

Card 2/2

S/081/62/000/023/081/120
B144/B186

AUTHORS: Bezdel', L. S., Brounshteyn, B. I., Ipat'yev, V. V.,
Teodorovich, V. P.

TITLE: Phosphate purification of the liquefied propane-propylene
fraction from hydrogen sulfide

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 23, 1962, 592, abstract
23M184 (Tr. Vses. n.-i. in-t neftekhim. protsessov, no. 5,
1962, 217 - 255)

TEXT: With the aim of using aqueous K_3PO_4 solutions to purify the lique-
fied propane-propylene fraction from H_2S , a detailed study was made of the
physico-chemical properties of K_3PO_4 solutions, of the equilibrium-distribu-
tion curves of H_2S in counter-current columns, and of the conditions for the
regeneration of the spent K_3PO_4 solutions. [Abstracter's note: Complete
translation.]

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APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755310011-7"

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ACCESSION NR: AT4007032

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ACCESSION NR

ENCLOSURE

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"APPROVED FOR RELEASE: 07/16/2001

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APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755310011-7"

ACCESSION NR: AT4007033

S/2598/63/000/010/0116/0130

AUTHOR: Glikman, L.A.; Deryabina, V.I.; Kolgatin, N.N.; By*tenkiy, I.A.;
Teodorovich, V.P.; Teplov, N.S.

TITLE: Effect of gas-saturated layer on the strength and ductility characteristics of titanium alloys

SOURCE: AN SSSR. Institut metallurgii. Titan i yego splavy*, no. 10, 1963.
Issledovaniya titanovy*kh splavov, 116-130

TOPIC TAGS: titanium alloy strength, titanium alloy ductility, VT-14 titanium alloy, VT-3-1 titanium alloy, VT-8 titanium alloy, gas saturated layer, titanium alloy

ABSTRACT: Contamination of titanium by air and its effect on strength and ductility was investigated following exposure of five alloys: VT-14 (Ti-Al-Mo-V), VT-3-1 (Ti-Al-Mo-Cr), VT-8 (Ti-Al-Mo) and Experimental Alloy No. 1 (4.95 Al, 2.18 V, 3.50 Sn, balance Ti), at 800-1100C for 0.5 to 4 hours. Microscopic examination showed that in air, above an O₂ concentration of 5%, oxygen diffuses into Ti and a superficial alpha-Ti phase forms which is characterized by increased hardness and reduced ductility. The strength of the specimens, however, was

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ACCESSION NR: AT4007033

markedly reduced. Thus, at 1100C, yield point and strength decreased 40-60%, notch toughness decreased 70-80%, and ductility dropped to zero in about 4 hours. At 800C, on the other hand, there was little change. All alloy specimens investigated exhibited high notch sensitivity in both static and dynamic tests, especially those saturated at 800C. The original mechanical properties could be restored by removal of the gas-contaminated surfaces. Orig. art. has: 7 tables and 7 figures.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute AN SSSR)

SUBMITTED: 00

DATE ACQ: 27Dec63.

ENCL: 00

SUB CODE: MM

NO REF SOV: 003

OTHER: 001

Card 2/2

MOROZ, L.S.; KOLGATIN, N.N.; TEODOROVICH, V.P.; DERYABINA, V.I.

Effect of hydrogen on the mechanical properties of nickel and
copper. Fiz. met. i metalloved. 16 no.5:737-742 N '63.
(MIRA 17:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut neftekhimicheskikh protsessov.

TEODOROVICH, V.P.; KOLGATIN, N.N.; DERYABINA, V.I.

Results of an examination of the metal parts of a catalytic
reforming apparatus. Mash. i nef. obor. no.3:15-20 '64.
(MIRA 17:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut
neftekhimicheskikh protsessov.

"APPROVED FOR RELEASE: 07/16/2001

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APPROVED FOR RELEASE: 07/16/2001

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